# Magnavox
## SERVICE MANUAL

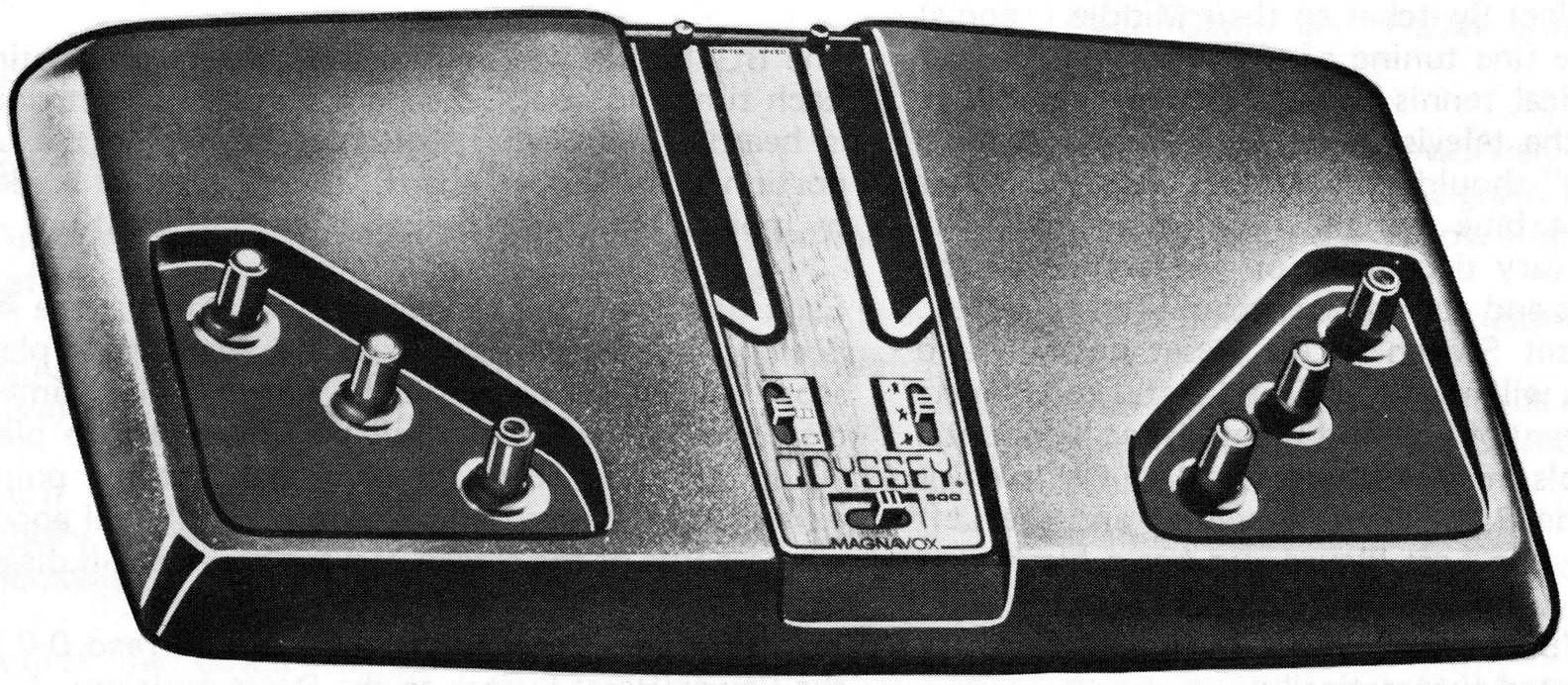
THE MAGNAVOX COMPANY • SERVICE DEPARTMENT
FORT WAYNE, INDIANA

**Manual No. 6506**

File: Volume 12
Miscellaneous Section
First Issue: December, 1976

# BG7520 ODYSSEY

**Scanned by Sly DC (2018)**




## GENERAL INFORMATION

The BG7520 Odyssey is powered by a 9 volt 200 ma AC adaptor. The unit features four games: Hockey, Tennis, Smash, and Soccer, and three different styles of players. As a test of your skill it also incorporates Ball (English) Controls and a Ball Speed Control.

The BG7520 also features a full color background and color players, automatic "Ball" serve, and digital on-screen scoring.

## SPECIFICATIONS

| | Minimum | Nominal | Maximum |
|---|---|---|---|
| Regulated Voltage Supply | | | |
| Measured at Pin 3 of IC1 | 4.5V | 5.0V | 5.5V |
| Current Drain | | | |
| BG7520 | ----- | 185 Ma | 200 Ma |
| Vertical Sync | | | |
| Frequency | 59 Hz | 60 Hz | 61 Hz |
| Pulse Amplitude | 2.8V | 4.0V | ----- |
| Pulse Width | | 200.0 usec. | |
| Horizontal Sync | | | |
| Frequency | 15.684 KHz | 15.734 KHz | 15.784 KHz |
| Pulse Amplitude | 3.5V | 4.0V | ----- |
| Pulse Width | | 5.0 usec. | |
| RF Carrier Frequency | | | |
| Channel 3 | 61.22 MHz | 61.25 MHz | 61.28 MHz |
| Channel 4 | 67.22 MHz | 67.25 MHz | 67.28 MHz |
| RF Output | | | |
| Into 300 ohms | 2000 uV | ----- | 4000 uV |



Printed in U.S.A., Copyright 1976

## TYPICAL OPERATION (TENNIS)

Connect the 300 ohm twin lead from the Antenna/Game Switch to the 300 ohm antenna terminals of a properly adjusted and operating television receiver. Connect the game cord cable from the Odyssey Unit to the Antenna/ Game Switch and place the Game/TV Switch in the Game position.

Place the Channel Switch on the Odyssey to either channel 3 or 4 and the television VHF Channel Selector to the same channel. The Channel Switch on the BG7520 is located in the upper right portion of the Master Board.

Place the Power/Reset Switch in the "ON" position and the Game and Player Select Switches to their Middle (Tennis) positions. Adjust the fine tuning of the television receiver if necessary. A typical tennis court and two large "W's" should be seen on the television screen. If viewed on a color set, the "Court" should appear light green, the center line and left W light blue and the right W yellow. The specific colors may vary depending on the setting of the color, tint, brightness and contrast controls. To begin play, move the Power/Reset Switch to the Reset position and release it. The score will reset to 0-0 and 2 stylized Players will appear. (Adjustment of Left and Right Player Horizontal and Vertical Controls may be necessary). On a color television receiver, the Right Player is yellow and the Left Player is light blue. The Left Player also has a black spot in the middle which serves to distinguish it from the right player when the BG7520 is used with a black and white set. The "Ball" will be served automatically.

The game is then played by each opponent operating the Vertical Player, Horizontal Player, and Ball Control for his side of the court. A rebound circuit will keep the "Ball" from going off the top and bottom of the screen. When the "Ball" is light blue, only the Ball Control on the left side of the Master Control Unit will affect the "Ball". When the "Ball" is yellow, only the Ball Control on the right side of the Master Control Unit will affect the "Ball".

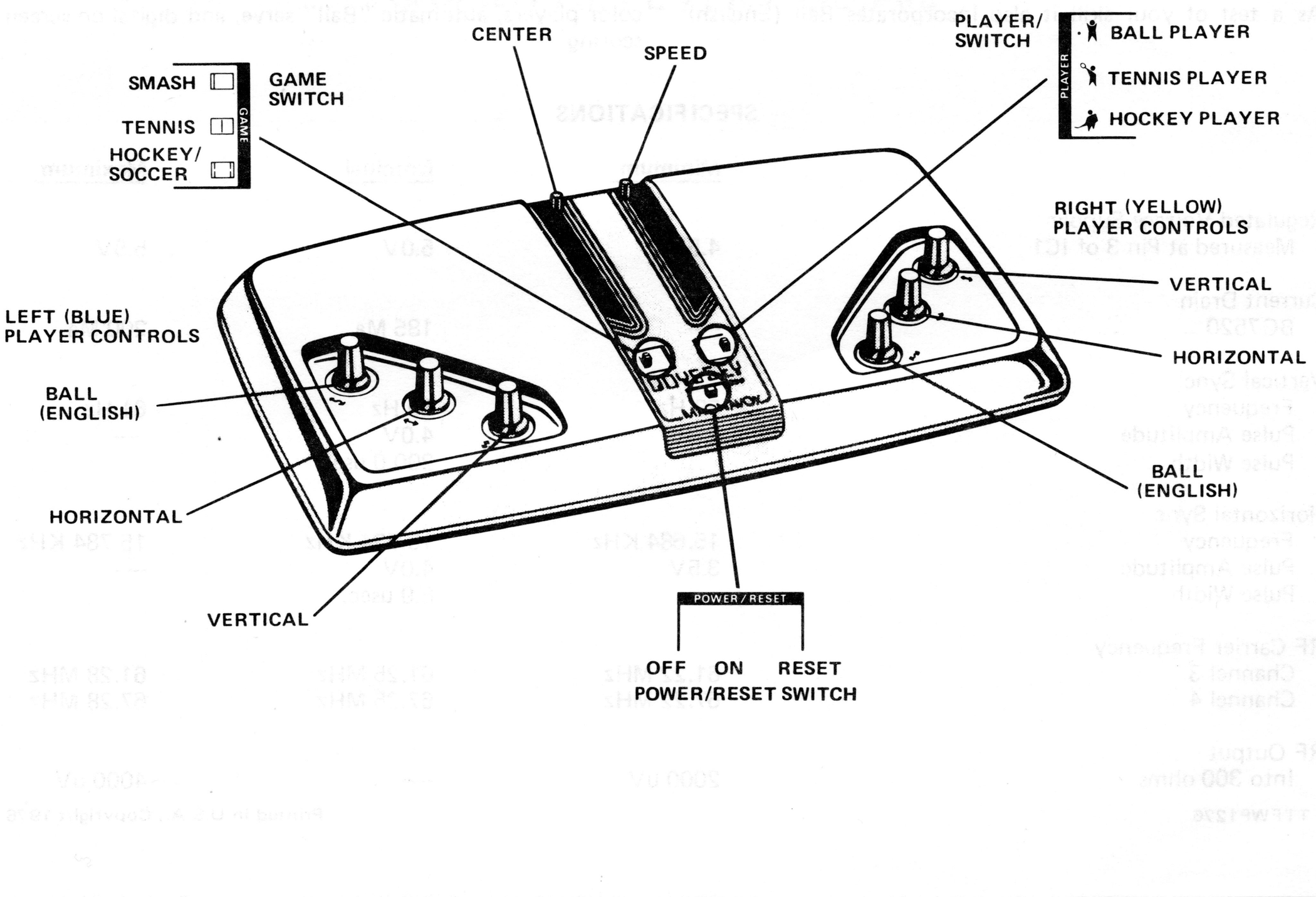
When the Game/Player Switches are in the Soccer position, the Player that has control of the "Ball" will also have control of the Goal opening. The Goal opening can then be made to move vertically by turning the Ball Control.

The BG7520 is also equipped with electronic action sound. Each time the "Ball" strikes a player, an electronic "Beep" is heard. The Sound Switch is located in the upper left portion of the Master Board. The sound may be deactivated by moving the Sound Switch to the Off position.

Each time the "Ball" leaves the playing area, the Automatic Scoring will award a point to the appropriate player. The score will be displayed on the screen a short time and then disappear. The "Ball" will be returned into play by the automatic serve from the side that lost the point. After either player has scored 20 points, a "W" will appear on the winners side of the screen and the players will disappear.

To start a new game, reset the score to read 0-0 by sliding the Power/Reset Switch to the Reset position.

### TOP VIEW OF BG7520



# SERVICE ADJUSTMENTS

Before attempting to make any service adjustments, check entire board for shorts or cracks. Total current drain should be monitored at all times. Drawing excessive current at any time will necessitate replacement of IC1 regulator, Sync IC.

### Score Indicator Position

1. Obtain W-W Win Indicators on the screen by momentarily placing the Power/Reset Switch to the "OFF" position and then back on.

2. Adjust R102 Score Oscillator Adjust to visually center the letters on the raster.

### Top and Bottom Rebound Adjustment

1. Connect 3 VDC bias to Pin 3 of IC3.

2. Turn the Right Ball Control, R40, fully clockwise and Left Ball Control, R41, fully counterclockwise.

3. Adjust Upper Rebound Control, R3, until the entire "Ball" is visible at the top edge of the screen.

4. Turn the Right Ball Control, R40, fully counterclockwise and the Left Ball Control, R41, fully clockwise.

5. Adjust the Lower Rebound Control, R2, until the entire "Ball" is visible at the bottom edge of the screen.

### Blanking Width and Centering Adjustment

1. Connect an oscilloscope to Pin 5 of IC2.

2. Adjust Blanking Width Control, R43, for a blanking pulse, 14 usec. (+1 usec. -0 usec.) wide. (See Figure 1.)

3. Adjust Blanking Centering Control, R44, for horizontal sync, 3 usec. ± .5 usec, after the leading edge of horizontal blanking.

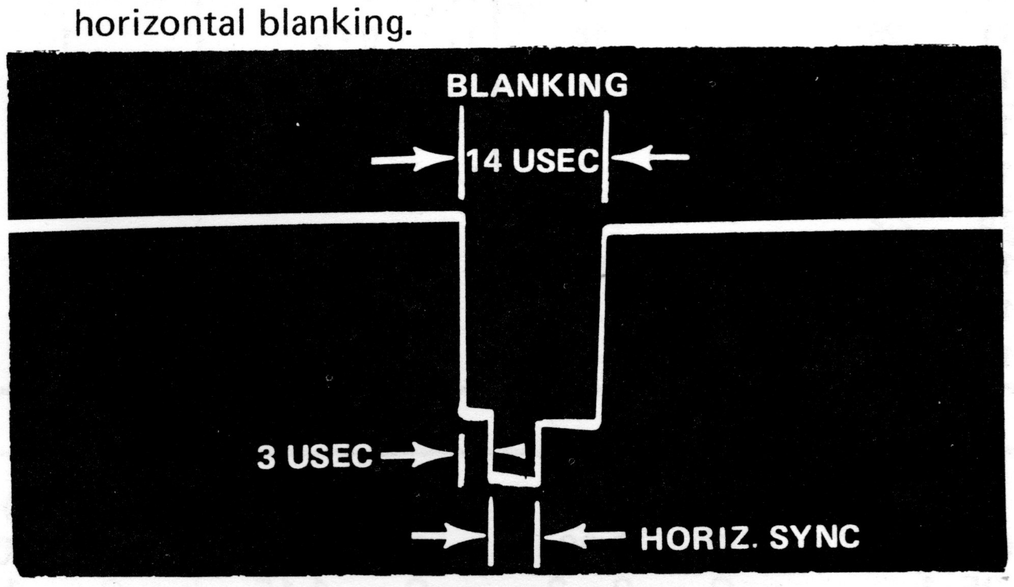



FIGURE 1

At no time shall any adjustments be made concerning RF Filter Alignment, RF Oscillator Alignment, or RF Output Level Adjust. The Video Level Adjustment and 3.58 MHz Oscillator Timing Adjust may be made only after it has been determined that it is absolutely essential.

### Video Level Adjustment

1. Adjust Video Level Control, R62, until good contrast in the picture is obtained.

### 3.58 MHz Oscillator Timing Adjust

1. Place Game and Player Select Switches in Tennis position.

2. Using a plastic screwdriver, adjust the 3.58 MHz. Adjust C41 for a light green background, a light blue Left Player, and a Yellow Right Player.

### Background Color Control Adjustment

1. This adjustment can be made only on a color receiver. Place Game and Player Select Switches in the Tennis position.

2. Adjust background Color Control, R54, for a green background. (R54 will affect the background only).

3. Check background in Hockey, Smash and Soccer Switch positions. Hockey should appear Cyan. Smash should appear Magenta. Soccer should appear Red.

### Player Size Balance Adjustment

1. Place Player Select Switch in Smash position.

2. Superimpose the Left and Right Player on the screen.

3. Adjust Player Size Balance Control, R67, to obtain equal character size.

### Right Wall Horizontal Position

1. Place Game Select Switch in Hockey position.

2. Adjust Right Wall Control R13 until the entire right wall is visible on the right edge of the screen.

### Goal Opening Position

1. Place the Game Select Switch in Hockey position.

2. Adjust Goal Position Control, R25, until the goal is positioned vertically in the center of the screen.

## IC BASIC FUNCTIONS

**IC1**
- A. Voltage RFgulator
- B. Horizontal Sync. Generator
- C. Vertical Sync Generator
- D. Right Wall Generator
- E. Rebound Circuitry

**IC2**
- A. Video Logic Controller

**IC3**
- A. Left Wall Generator
- B. Ball Generator

**IC4**
- A. Color Generator
- B. Color Sync Generator
- C. Video Summer

**IC5**
- A. Character Generator

**IC6**
- A. Digital Score Generator

**IC7**
- A. Character Controller

**IC8**
- A. Input, Gate Generator

# VOLTAGE CHARTS

| IC1 | | | IC2 | | | IC3 | | | IC4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE |
| 1 | 0 | ----- | 1 | 5.25 | ----- | 1 | .3 | ----- | 1 | .7 - 4.4 | 2 |
| 2 | 9.0 | ----- | 2 | 1.3 - 5.25 | 12 | 2 | 5.25 | ----- | 2 | 0 | ----- |
| 3 | 5.25 | ----- | 3 | .3 | ----- | 3 | 2.5 - 3.1 | 1 | 3 | .75 - 1 | 13 |
| 4 | 0 | ----- | 4 | 0 | ----- | 4 | 1.4 - 2 | 1 | 4 | 2.6 | ----- |
| 5 | 2.6 | ----- | 5 | 3.7 | ----- | 5 | 2.6 | 2 | 5 | 2.6 | ----- |
| 6 | .5 - 1.1 | 4 | 6 | 0 | ----- | 6 | 3.83 | ----- | 6 | 1.4 | ----- |
| 7 | 1.2 - 1.7 | 5 | 7 | .1 | ----- | 7 | 1.3 | ----- | 7 | 0 | ----- |
| 8 | 0 | ----- | 8 | .1 | ----- | 8 | .11 | ----- | 8 | 3.7 | ----- |
| 9 | .1 | ----- | 9 | .13 | ----- | 9 | .2 | ----- | 9 | 0 | ----- |
| 10 | .2 | ----- | 10 | .2 | ----- | 10 | 1.45 | ----- | 10 | 0 | ----- |
| 11 | 4.01 | ----- | 11 | 0 | ----- | 11 | 5.25 | ----- | 11 | .3 | ----- |
| 12 | 2.35 | ----- | 12 | .7 - 4.5 | 2 | 12 | 1.1 - 3.5 | 6 | 12 | 1.2 - 4.2 | 14 |
| 13 | 1.7 - 4.7 | 7 | 13 | .7 - 4.4 | 2 | 13 | 1.5 | ----- | 13 | 1.87 | ----- |
| 14 | .05 | ----- | 14 | 0 - 4.6 | 1 | 14 | 1.5 - 3.1 | 3 | 14 | 5.25 | ----- |
| 15 | 5.25 | ----- | 15 | 5.25 | ----- | 15 | 0 | ----- | 15 | 0 | ----- |
| 16 | .3 | ----- | 16. | .11 | ----- | 16 | 0 | ----- | 16 | 0 | ----- |
| 17 | 0 | ----- | | | | | | | 17 | .1 | ----- |
| 18 | 0 | ----- | | | | | | | 18 | .11 | ----- |
| | | | | | | | | | 19 | 0 | ----- |
| | | | | | | | | | 20 | .2 | ----- |

| IC5 | | | IC6 | | | IC7 | | | IC8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE | PIN | VOLTAGE | NOTE |
| 1 | 0 | ----- | 1 | 5.25 | ----- | 1 | 3.81 | ----- | 1 | .2 | ----- |
| 2 | 0 | ----- | 2 | .7 - 4.4 | 2 | 2 | 1.3 - 4.5 | 9 | 2 | 1.45 | ----- |
| 3 | 0 | ----- | 3 | .1 | ----- | 3 | 1.3 | ----- | 3 | 0 | ----- |
| 4 | 0 | ----- | 4 | 2.63 | ----- | 4 | 1.3 - 4.5 | 11 | 4 | 0 | ----- |
| 5 | 0 | ----- | 5 | 0 | ----- | 5 | 1.6 | ----- | 5 | 0 | ----- |
| 6 | .2 | ----- | 6 | .13 | ----- | 6 | 0 | ----- | 6 | 5.25 | ----- |
| 7 | .1 | ----- | 7 | 0 | ----- | 7 | .55 - .61 | 16 | 7 | 0 | ----- |
| 8 | 0 | ----- | 8 | 0 | ----- | 8 | .3 | ----- | 8 | 0 | ----- |
| 9 | 1.7 | ----- | 9 | .1 | ----- | 9 | 5.25 | ----- | 9 | 0 - 5 | 1 |
| 10 | 0 | ----- | 10 | 0 | ----- | 10 | .15 | ----- | 10 | 0 | ----- |
| 11 | .07 | ----- | 11 | 0 | ----- | 11 | .26 | 16 | 11 | 0 - 5 | 1 |
| 12 | 0 | ----- | 12 | 0 | ----- | 12 | .3 | ----- | 12 | 2.2 - 3.3 | 1 |
| 13 | 0 | ----- | 13 | 0 | ----- | 13 | 1.6 | ----- | 13 | 2.2 - 3.3 | 1 |
| 14 | 0 | ----- | 14 | 1.2 - 1.4 | 15 | 14 | 1.3 - 4.5 | 10 | 14 | 5.25 | ----- |
| 15 | 1.0 | ----- | 15 | .9 | ----- | 15 | 2.2 | ----- | | | |
| 16 | 0 | ----- | 16 | .3 | ----- | 16 | 1.3 - 4.5 | 8 | | | |
| | | | | | | 17 | 0 | ----- | | | |
| | | | | | | 18 | 0 | ----- | | | |

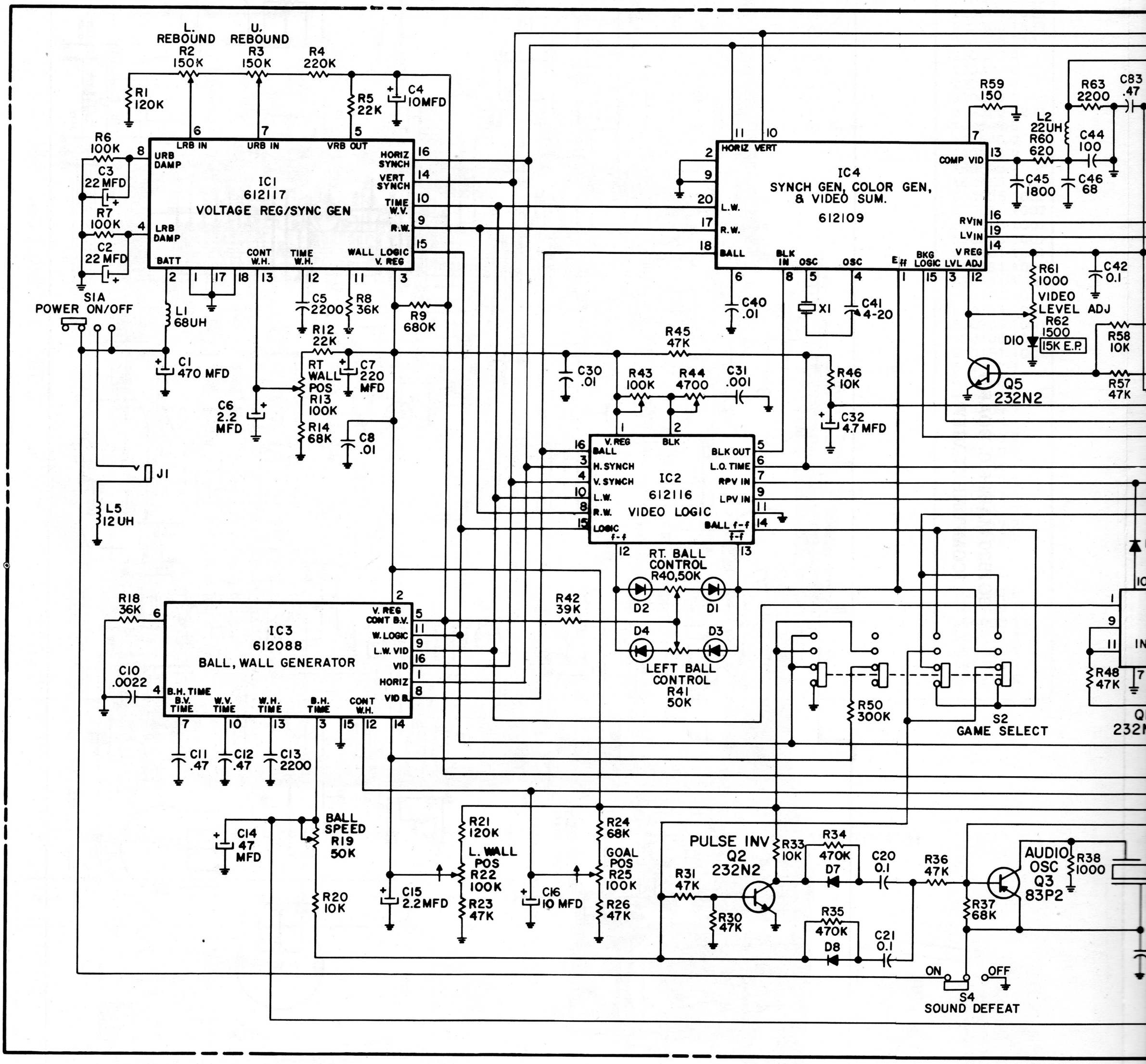
| TRANSISTOR | Q1 | | Q2 | | Q3 | | Q4 | | Q5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| VOLTAGE, NOTE | E | 0 | E | 0 | E | 9.75 | E | 0 | E | 0 |
| | B | 0 - .65V, 1 | B | .3 - .6, 1 | B | 9.69 | B | .64 | B | .05 |
| | C | 5.25V | C | 0 - 5.25, 1 | C | 0 - .2 | C | 1.15 | C | 1.58 |

**NOTES:**

VOLTAGES TAKEN WITH VTVM, LINE VOLTAGE MAINTAINED TO PROVIDE 9 VDC AT PIN 2 OF IC1, OPERATING ON CHANNEL 4, SOUND ON, GAME/PLAYER SWITCHES IN CENTER (TENNIS) POSITION, BALL ADJUSTED FOR LOWEST SPEED, VOLLEYING BETWEEN CENTERED PLAYERS.

1. Voltage varies with Ball Speed and distance traveled.
2. Voltage varies with Right or Left Ball Control.
3. Voltage varies with Left Wall Position Control.
4. Voltage varies with Lower Rebound Control.
5. Voltage varies with Upper Rebound Control.
6. Voltage varies with Goal Position Control.
7. Voltage varies with Right Wall Position Control.
8. Voltage varies with Right Player Horizontal Position.
9. Voltage varies with Left Player Horizontal Position.
10. Voltage varies with Right Player Vertical Position.
11. Voltage varies with Left Player Vertical Position.
12. Voltage varies with Blanking Centering and Width.
13. Voltage varies with Background Adjust Control.
14. Voltage varies with Video Level Adjust.
15. Voltage varies with Score Oscillator Adjust.
16. Voltage varies with Player Size Balance Adjust

# BG7520 SCHEMATIC

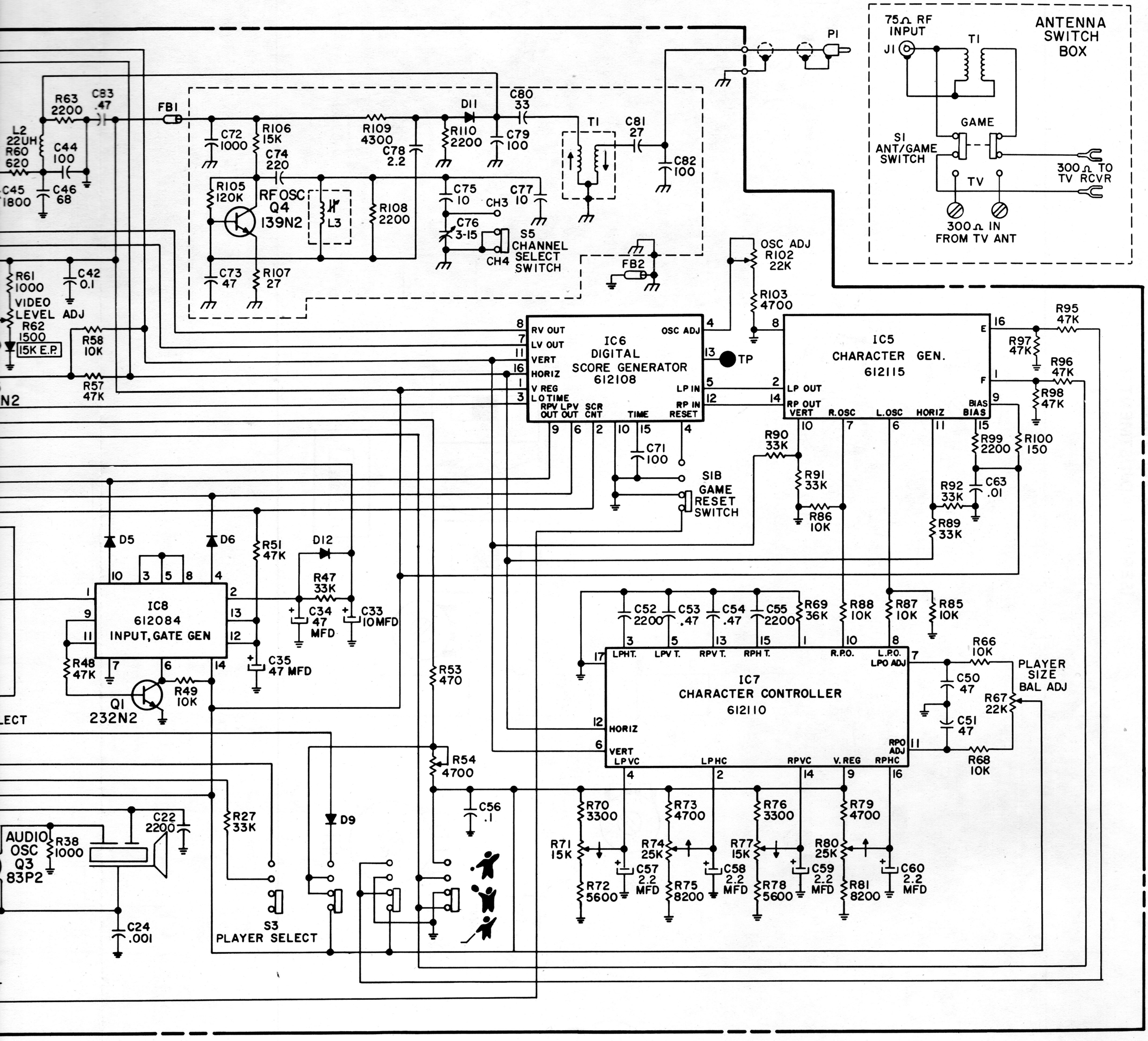



NOTES:

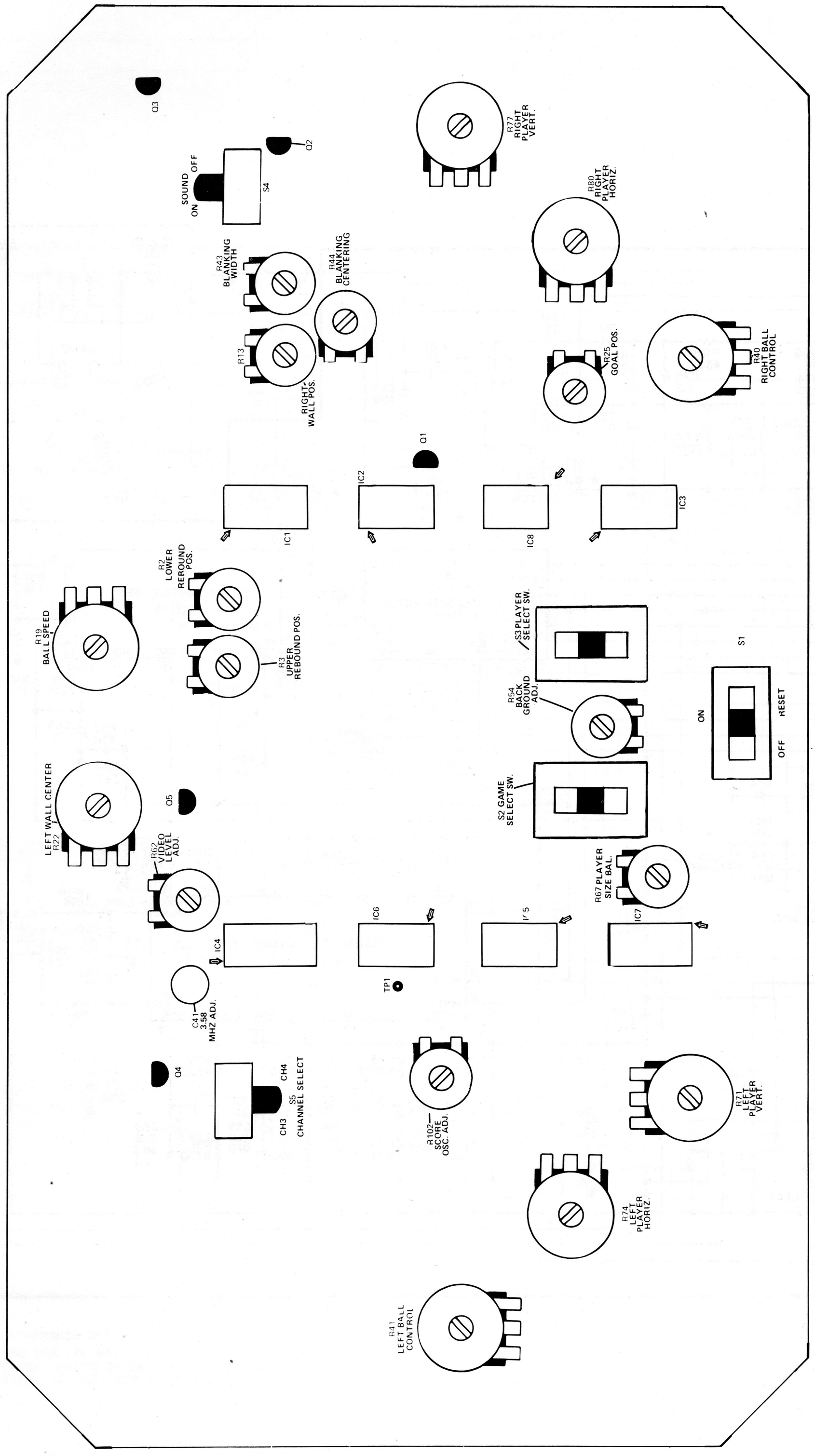
UNLESS OTHERWISE SPECIFIED:

1. RESISTORS ARE 1/4 WATT, 5% TOLERANCE.
2. CAPACITANCE VALUES OF ONE OR MORE ARE IN PICOFARADS.
3. CAPACITANCE VALUES LESS THAN ONE ARE IN MICROFARADS.

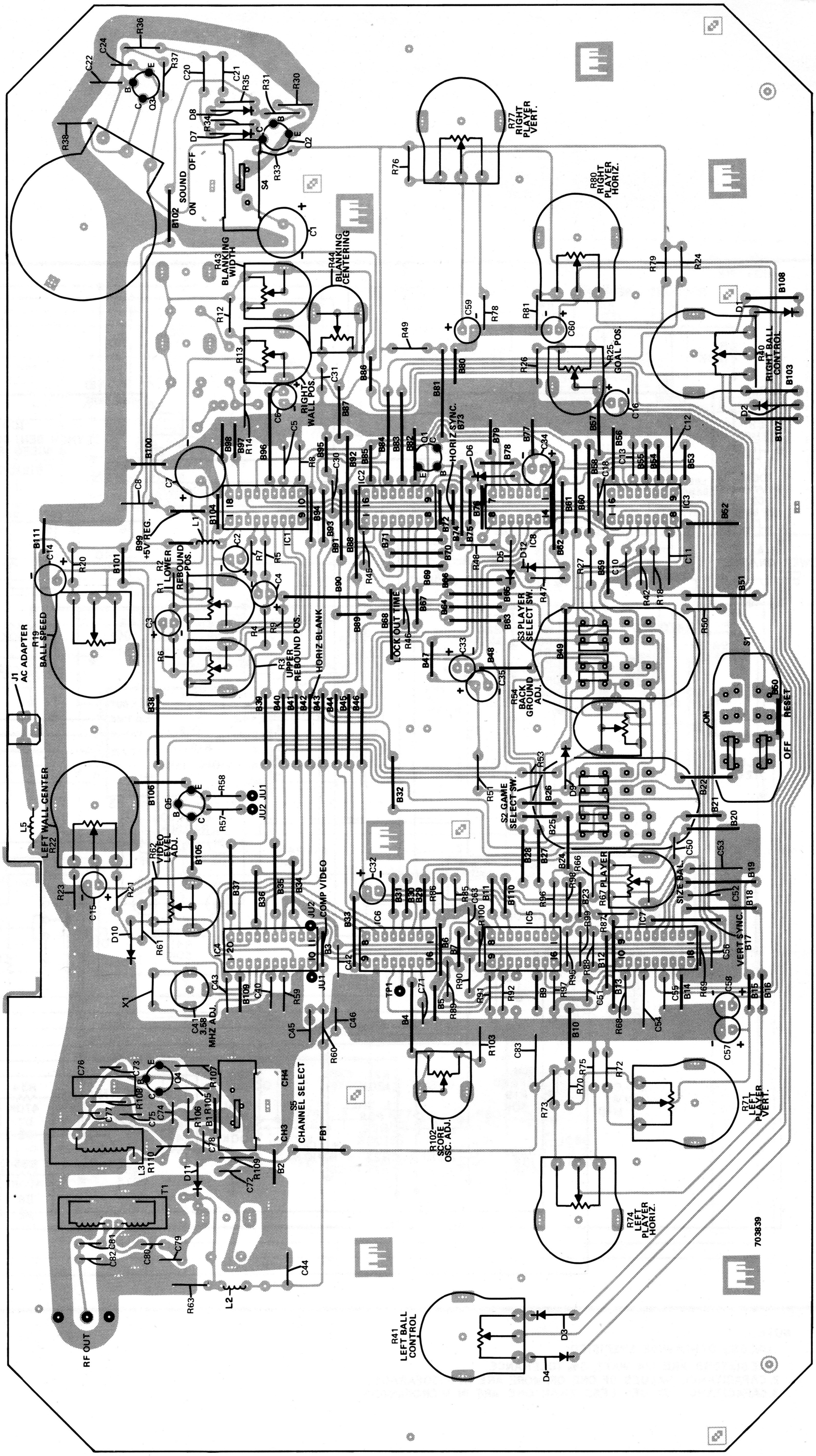
# 0 SCHEMATIC DIAGRAM



# BG7520 TOP VIEW
# (SERVICE ADJUSTMENTS)



# BG7520 MAIN P.C. BOARD (COMPONENT VIEW)



# REPLACEMENT PARTS LIST

**Note: When ordering replacement parts please specify the part number as shown in this list including Description, Chassis, and Model Number. Complete information will help expedite the order. Replacement parts may occasionally differ in part number or value from the Factory installed part. In either event the replacement part has been chosen to provide equal or improved performance.**

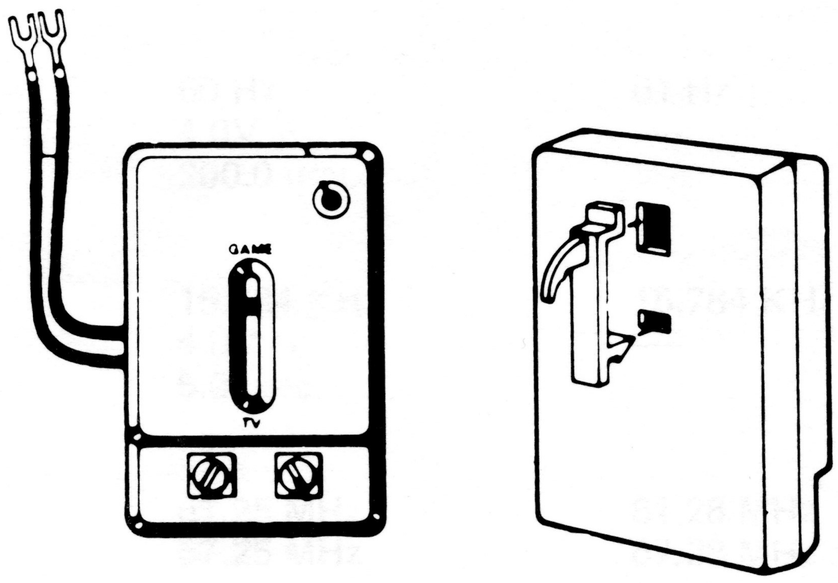
| REF. | DESCRIPTION | PART NO. |
|---|---|---|
| | COILS & TRANSFORMERS | |
| L1 | 68 uh Peaking Coil | 361475-680 |
| L2 | 22 uh Peaking Coil | 361475-220 |
| L3 | Oscillator Coil | 361495-2 |
| L5 | 12 uh Coil | 361425-120 |
| T1 | Adjustable RF Transformer | 361467-2 |
| | CAPACITORS<br>Values, tolerances and voltage ratings for capacitors not listed are shown on the schematic, or are 10%, 500V. | |
| C1 | Electrolytic, 470 mfd., 16V | 270109-5215 |
| C2 | Electrolytic, 22 mfd., 25V | 270111-2125 |
| C3 | Electrolytic, 22 mfd., 25V | 270111-2125 |
| C4 | Electrolytic, 10 mfd., 25V | 270111-1125 |
| C6 | Electrolytic, 22 mfd., 50V | 270109-2050 |
| C7 | Electrolytic, 220 mfd., 16V | 270109-2215 |
| C11 | Polyester, .47 mfd.,5%,100V | 250600-13 |
| C12 | Polyester, .47 mfd.,5%,100V | 250600-13 |
| C14 | Electrolytic, 47 mfd., 16V | 270111-5115 |
| C15 | Electrolytic, 2.2 mfd., 50V | 270109-2050 |
| C16 | Electrolytic, 10 mfd., 25V | 270111-1125 |
| C20 | Polyester, .1 mfd., 100V | 250654-1049 |
| C21 | Polyester, .1 mfd., 100V | 250654-1049 |
| C31 | Polyester, .001 mfd., 5%, 150V | 250635-1025 |
| C32 | Electrolytic, 4.7 mfd., 50V | 270111-5050 |
| C33 | Electrolytic, 10 mfd., 25V | 270111-1125 |
| C34 | Electrolytic, 47 mfd., 16V | 270111-5115 |
| C35 | Electrolytic, 47 mfd., 16V | 270111-5115 |
| C41 | Trimmer, 3-15 pf. | 260220-4 |
| C42 | Polyester, .1 mfd., 100V | 250654-1049 |
| C53 | Polyester, .47 mfd., 100V | 250600-13 |
| C54 | Polyester, .47 mfd., 100V | 250600-13 |
| C56 | Polyester, .1 mfd., 100V | 250654-1049 |
| C57 | Electrolytic, 2.2 mfd., 50V | 270109-2050 |
| C58 | Electrolytic, 2.2 mfd., 50V | 270109-2050 |
| C59 | Electrolytic, 2.2 mfd., 50V | 270109-2050 |
| C60 | Electrolytic, 2.2 mfd., 50V | 270109-2050 |
| C76 | Trimmer, 3-15 pf. | 250371-6 |
| C80 | Ceramic, 33 pf., 5%, 500V, NPO | 250546-3305 |
| C81 | Ceramic, 27 pf., 5%, 500V, NPO | 250546-2705 |
| | RESISTORS<br>Values, tolerances and wattages for resistors not listed are shown on the schematic, or are 5%, ¼W. | |
| R2 | 150K, Lower Rebound Position | 220300-1542 |
| R3 | 150K, Upper Rebound Position | 220300-1542 |
| R13 | 100K, Right Wall Position | 220300-1043 |
| R19 | 50K, Ball Speed | 220311-10 |
| R22 | 100K, Left Wall Position | 220311-11 |

| REF. | DESCRIPTION | PART NO. |
|---|---|---|
| R25 | 100K, Goal Position | 220300-1043 |
| R40 | 50K, Right Ball Control | 220337-6 |
| R41 | 50K, Left Ball Control | 220337-6 |
| R43 | 100K, Blanking Width | 220300-1043 |
| R44 | 4700, Blanking Centering | 220300-4723 |
| R54 | 4700, Background Level Adjust | 220300-4723 |
| R62 | 1500, Video Level Adjust (LP) | 220300-1523 |
| R62 | 15K, Video Level Adjust (EP) | 220300-1533 |
| R67 | 22K, Player Size Balance Adjust | 220300-2233 |
| R71 | 15K, Left Player Vertical | 220337-4 |
| R74 | 25K, Left Player Horizontal | 220337-5 |
| R77 | 15K, Right Player Vertical | 220337-4 |
| R80 | 25K, Right Player Horizontal | 220337-5 |
| R102 | 22K, RF Osc. Adjust | 220300-2233 |
| S1 | Power/On-Off & Game Reset | 160546-5 |
| S2 | Game Select | 160546-2 |
| S3 | Player Select | 160546-2 |
| S4 | Sound Defeat | 160556-1 |
| S5 | Channel Select | 160556-1 |
| D1 | Detector Diode | 530065-1002 |
| D2 | Detector Diode | 530065-1002 |
| D3 | Detector Diode | 530065-1002 |
| D4 | Detector Diode | 530065-1002 |
| D5 | Silicon Diode | 530181-1001 |
| D6 | Silicon Diode | 530181-1001 |
| D7 | Silicon Diode | 530181-1001 |
| D8 | Silicon Diode | 530181-1001 |
| D9 | Silicon Diode | 530181-1001 |
| D10 | Germanium Diode | 530105-1001 |
| D11 | Germanium Diode | 530105-1001 |
| D12 | Silicon Diode | 530181-1001 |
| IC1 | Voltage Regulator/Sync Generator | 612117-1 |
| IC2 | Video Logic | 612116-1 |
| IC3 | Ball/Wall Generator | 612088-1 |
| IC4 | Color Gen. & Video Summer | 612109-1 |
| IC5 | Character Generator | 612115-1 |
| IC6 | Score Generator | 612108-2 |
| IC7 | Character Controller | 612110-1 |
| IC8 | Quad/Dual Input & Gate Generator | 612084-1 |
| Q1 | NPN Silicon | 610232-2 |
| Q2 | NPN Silicon | 610232-2 |
| Q3 | PNP Silicon | 610083-2 |
| Q4 | NPN Silicon | 610139-2 |
| Q5 | NPN Silicon | 610232-2 |
| | MISCELLANEOUS | |
| | AC Adaptor | 701284-6 |
| J1 | External Power Jack | 181139-1 |
| FB1,2 | Ferrite Bead | 364005-1 |
| X1 | Crystal | 560404-2 |
| | Speaker (Ceramic Crystal) | 560406-1 |
| | Speaker Housing | 181189-1 |
| | Game Cable Assembly | 461218-5 |

## ANTENNA/GAME SWITCH REPLACEMENT PARTS LIST

| REF. | DESCRIPTION | PART NO. |
|---|---|---|
| J1 | Phono Socket | 180902-4 |
| S1 | Antenna/Game Switch | 160499-2 |
| T1 | Antenna Balun | 361108-2 |
| | Case, Top | 143676-1 |
| | Case, Bottom | 143674-1 |
| | Plastic Hook | 143719-1 |
| | Screw Terminal (2 used) | 200495-1 |
| | Solderless Terminal (2 used) | 200517-1 |
| | Game Cable Assembly | 461218-5 |
| | Complete Antenna/Game Sw. Ass'y. | 701702-3 |

## ANTENNA/GAME SWITCH



# CABINET REPLACEMENT PARTS LIST

**Note: When ordering replacement parts, please specify the part number as shown in this parts list including Description, Chassis Number, Model and Run Number. Complete information will help expedite the order.**

| DESCRIPTION | PART NO. |
|---|---|
| Case, Top | 143670-6 |
| Case, Bottom | 143669-6 |
| Control Knob | 143689-6 |
| Control Knob | 143689-7 |
| Switch Inlay | 151449-3 |
| Switch Inlay | 151449-5 |

| DESCRIPTION | PART NO. |
|---|---|
| Top Inlay | 151483-3 |
| Knob, Underlay Skirt | 151482-1 |
| Foot, Black | 141737-3 |
| "O" Ring Retainer | 103082-4 |
| Spring Lock Nut | 103235-1 |
| Stud, Cover Holding | 732953-2 |

MAGNAVOX

QUALITY IN EVERY DETAIL